ABSTRACT
                If any one fact has emerged consistently in the
International Project for the Evaluation of Educational Achievement
(IEA) studies of educational achievements, it is that achievement is
related to a variety of factors in the home background of children.
This is true so far as differences in the achievements of single
students within a country are concerned. It is also true so far as
mean score for different countries is concerned. Several questions
can be posed with respect to these relationships. Firstly, how
substantial are the relationships, both within and between countries?
Are they merely "statistically significant," or are they of a size
that has "practical significance?" Secondly, how stable are the
relationships from subject matter to subject matter and from country
to country? Are the factors that receive most weight as predictors of
reading the same as the ones that receive most weight for prediction
of science or of literature? Are the factors that are most predictive
in the U.S.A. also most predictive in England or Iran or Chile? If
not, what reasonable explanation can be offered for the differences?
Thirdly, are the facts that are most predictive of individual
differences also the ones that are most predictive of national
differences? If not, why not? In spite of the modest correlations
that we obtained for background variables, these seemed to be much
more effective predictors than any of the items that described the
school as an educational unit. [Reproduced from the best available
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The Relation of School Achievements to Differences

in the Backgrounds of Children

by

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If any one fact has emerged consistently in the IEA studies of
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ences? If not, what reasonable explanation can be offered for the
differences?

As a partial answer to the first question, we show in Table 1
the median correlation over all countries for a number of home and
community variables. Correlations are shown with score in Reading
Comprehension, Science and Literature Tests for groups of 10-year-

olds, 14-year-olds, and students at the end of secondary school.
In addition, Table 2 shows the correlation for a weighted composite
of the more predictive of these variables for each country taken
separately. Table 1 shows which of the elements of home background
taken singly showed some appreciable correlation with the achieve-
ment measures. Table 2 shows how much of a prediction was possible
from composites of the variables, and how uniform the relationship
was from country to country.

The median correlations in Table 1 are, in general, quite
low. The two most predictive single items of information are father's
occupation and number of books in the home, with correlations in the
20's for 10-year-olds and 14-year-olds, but smaller at the end of
secondary school. Other items of information show even smaller
correlations. Why are the relationships no more substantial than
this? There are at least three main contributing factors. One re-
lates to the crudeness of the data. Information was obtained from
pupils by questionaire, and was typically reported in no more than
five response categories. The response categories were chosen so
as to be most effective over the whole range of countries being
studied. Thus, the question on books in the home read

"About how many books are there in your home?
(Do not count newspapers or magazines) (Choose one)

    A. None

    B. 1 - 10 books

    C. 11 - 25 books

    D. 26 - 50 books

    E. 51 or more books

To show some of the problems of using a questionaire item
such as this internationally the proportions of responses are shown

below for 14-year-olds in India and in Sweden.

	India	Sweden
A	11.9%	0.9%
B	35.9%	2.0%
C	22.5%	7.0%
D	12.3%	18.3%
E	17.4%	71.8%

Though the five response categories serve to bring out very sharply
the difference between India and Sweden in home circumstances, they
are not well chosen to differentiate the size of home libraries in
Sweden. Over 70% of the responses fall in a single category. Un-
der the circumstances, the correlation of 0.27 found for Sweden
should, perhaps, be considered rather surprisingly high. Many items
involved groupings at least as coarse as the one illustrated.

Or consider the coding of father's occupation. The basic datum
was the pupil's response to the instruction:

> Please write your father's occupation.————On the lines be-
> low, describe his occupation as clearly as you can.

_____

From the statement provided by the pupil, a coder assigned the occu-
pation to one of not more than nine categories. The categories
were specified by each national center in terms that made sense for
that country. In the United States the categories were:

9 Professional, technical and kindred workers

8 Managers, officials and proprietors, including
farm owners and managers

7 White collar workers

6 Skilled manual workers

5 Semi-skilled workers

4 Farm workers, fishery, forestry and kindred groups

3 Domestic and personal service workers

2 Laborers

1 Unclassifiable

0 Unknown

Scale values were empirically determined for each of the cate-
gories so as to maximize the correlation of the scaled variable with
achievement. However, the basic categories were chosen more in terms
of their demographic than of their psychometric relevance. Further-
more, coding was based on the limited and sometimes ambiguous infor-
mation supplied by the pupil. The fact that an "Unclassifiable"
category was required and was used for 13.6% of the 10-year-olds,
8.1% of the 14-year-olds and 6.4% at the end of secondary education
in the United States serves to document the difficulty that coders
experienced in working with the information that the questionnaire
supplied them. Even so, in the U.S.A. the correlation for this
scaled variable was 0.33 for 10-year-olds, 0.29 for 14-year-olds and
for high school seniors.

The second main attenuation in relationships may stem from in-
correctness in the information reported by pupils, especially the 10-
year-olds. Some preliminary work was done to check upon the depen-
dability of information reported in student questionnaires, checking

student reports against information gathered from direct contact with parents or from school records. The agreement was good enough to encourage the project to continue to rely upon pupils as the basic source of information about home and family circumstances. But, of course, the agreement was not perfect. And most of the pilot studies were done in developed countries with a relatively high standard of literacy. One must question whether the findings of these studies apply in developing countries where the average level of reading achievement is, as our surveys have indicated, much lower. As we shall see presently, it was in these developing countries, in which reading the the questionnaire items must have presented a very difficult reading task for many young people, that the correlations were lowest.

The third point to be mentioned is that each of the variables represent a specific, limited, and somewhat indirect indicator of the total environment in which the child has grown up. Books represent one resource for intellectual stimulation of the child, but magazines, newspapers, radio and television represent additional channels for intellectual stimulation. And sheer numbers of books tells nothing about the appropriateness of the books to a child or, in fact, what sorts of books are present, or whether anyone ever reads them.

If the indicators are individually of only modest power as predictors of achievement, how powerful are they as a team? This is the problem to which Table 2 provides some answer. The correlations here are for a composite home background variable, but the composite was somewhat differently arrived at for the three subject areas. In particular, items relating to reading resources in the home were ex-

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cluded and treated separately in the Literature analyses, whereas
they were included for the other two subjects. In general, in the
composite variable, component background factors were so weighted as to
maximize the correlations of the composite with the achievement measure.

We now see correlations running as high as 0.54, though the typ-
ical joint prediction falls somewhere in the 30's. The range of cor-
relations is quite large. How are we to interpret this?

Note first that the correlations are typically much lower at the
end of secondary school. , In most countries, the group still in school
at the end of secondary school is quite a select group--anywhere from
10 to 25 percent of the age group, the remainder having already drop-
ped out of school. Selectivity has operated on the basis of some com-
bination of academic competence and socio-economic status. Most of
those from the lower socio-economic groupings have dropped out unless
they were especially competent. Thus, the selection has operated both
to reduce the range of socio-economic status and leave in school a
very non-representative fraction of children from the lower socio-
economic strata. As a result, correlations have almost universally
dropped. The one exception is the United States, where perhaps 75% of
the age group completes secondary school, and where socio-economic var-
iables appear less related to the fact of dropping out of school. In
the U.S.A. the prediction of achievement for 18-year-olds is about as
accurate as at the earlier levels.

In addition to the difference between the end-of-secondary school
and the younger groups, there are notable differences between countries.
Considering reading comprehension, one notes composite correlations as

high as 0.54 in Israel, 0.53 in England and 0.51 in Scotland and the Uni-
ted States, while composite correlations reach only 0.14 in Chile (for
10-year-olds) and 0.15 in India. How are those differences to be un-
derstood?

One explanation would say that the countries that show the low
correlations are very homogeneous; that there is little variation from
pupil to pupil in the socio-economic indices in question, and conse-
quently little opportunity for co-variation to appear. This explanation
can apparently be rejected. At least, when we took three separate vari-
ables for 14-year-olds, and examined the relatonship between national
variability (standard deviation of responses on the scaled item) and
national correlation with reading comprehension score the correlations
were in each instance negative. The countries with the greater vari-
ability showed the smaller correlations. This negative value is prob-
ably not to be taken seriously, but it does at least argue against
any significant positive relationship.

A second explanation would assert that in the developing countries
many pupils were simply unable to read and respond meaningfully to the
student questionaire. It became clear, as the test papers from the IEA
study were processed, that many pupils in the three developing coun-
tries (Chile, India and Iran) were responding at or close to a chance
level on the reading tests. Tests that were designed to be, and in
fact were of appropriate difficulty for the typical pupil in the de-
veloped countries of Europe and its derivatives were clearly too dif-
ficult for children in these three countries. Since the student ques-
tionaire was in a sense a test of reading and of following directions,
and very probably as difficult as the 10-year-old version of the Read-

ing Comprehension Test, it seems reasonable to suppose that those who
were unable to handle the reading test, responding to it in a random
fashion, were also unable to handle the questionnaire and may have res-
ponded to its questions in a near-random fashion. Future investiga-
tors working with marginally literate populations may need to develop
other approaches to obtaining background information about their sub-
jects.

A third explanation, which does not exclude the previous one as a
contributory factor, is that the same indicator may have genuinely
different significance in different cultures. As an example, we may
take number of siblings. This variable showed a negative correlation
with achievement in all but one of the developed countries, the one ex-
ception being the Flemish-speaking area of Belgium. However, the cor-
relation was positive in several of the developing countries, e.g., In-
dia, Iran, and Thailand. Perhaps a small family signifies qualities of
restraint, planfulness and concern for children's education in most Eur-
opean-based western countries, but has quite different implications for
developing countries in the East. As another illustration, occupation-
al level turns out to be a much weaker predictor in such countries as
India, Iran and Thailand. Possibly in these countries there is no
clear-cut occupational hierarchy that has the same connotation of eco-
nomic advantage and cultural stimulation that seems to attach to this
hierarchy in the developed European-based countries.

It is hard to judge whether such differences do exist in the basic
significance of indicators until it is possible to rule out reading dif-
ficulties as a contributing factor. A future study in which information
about home and family is gathered at the source, that is, from a parent,

by a trained interviewer, would seem to be required if one is to reach a judgement as to the weight to be attached to the two explanatory factors.

Table 1 provides some evidence on the consistency of the relationship of background variables as one goes from one age level to another. Except for the fact that all correlations are lower for the 18-year-olds, consistency across ages and subjects seems to be the rule, and variations appear to be relatively minor. There is perhaps a suggestion that the availability of reading matter in the home is less important for science achievement than for achievement in reading and literature. Unfortunately, no data were gathered on home variables that might have been more related to science--possibly such an item as the availability of tools and a home workshop, or having a parent who carried out a wide variety of home repairs--so no variables appear that show a stronger relationship to achievement in science. Of course, sex of student is the one major exception to the consistent pattern, since boys tend to do markedly better on the science tests and girls on the literature tests.

There were a few surprises in the relationships that emerged, or sometimes those that failed to emerge. One group of variables was introduced to measure the home's level of interest in schooling and the home press for achievement. These were items that attempted to tap via questionaire some of the aspects of the home that had been found in interview-observation studies to show a strong positive relationship to achievement of a child. There were items such as:

How often does your mother or father help you with your homework?

When you talk at home, do your parents insist that you speak correctly?

When you get home from school, do your parents ask about your schoolwork?

However, examination of Table 1 shows that the correlations in this study
were all small and were sometimes negative. In particular, it appears
that the pupil's report that his parents help him with his homework is
more an indication of childish ineptitude than of parental commitment.
The correlation was negative practically without exception for all
countries, all subjects and all levels. Perhaps parental behavior as
seen and reported by a pupil is quite different from parental behavior
as reported by a parent or seen by an adult observer. But more likely
the information obtainable by questionnaire is getting at a different
type or level of parent involvement than is gotten by more probing ap-
proaches.

Table 2 provides some evidence on the consistency of prediction
through background variables as one goes from country to country. At-
tention has already been directed to the relatively low values in Chile,
India and Iran, and for all countries but the United States at the end
of secondary school, and possible explanations for these results have
been proposed. A further question might be: to what extent is a country
consistently high or low in the predictability of achievement? As one
answer to this, we have computed a coeffic. t of concordance over sev-
eral of the better predictors and over the two subject areas of reading
and science. Thus, for each predictor the available countries were
ranked for size of correlation coeficient, both for 10-year-olds and 14-
year-olds and the concordance of the ranks determined. For science the
coeficient of concordance was 0.76 and the average rank order correlation was
0.70; for reading the corresponding values were 0.81 and 0.78. Thus,
there is a substantial amount of consistency both over predictors and
over age groups in the countries in which prediction from background var-
iables is effective. An overall ranking of 13 countries from most to

least predictable would result in the following order:

1. Scotland

2. England

3. Hungary

4. United States

5. Finland

6. Belgium (French-speaking)

7. Chile

8. Sweden

9. Netherlands

10. Italy

11. Iran

12. Belgium (Flemish-speaking)

13. India

It is interesting to speculate on what accounts for this order.
As previously noted, prediction was relatively poor in the developing
countries, especially Iran and India, and possible reasons have been
offered for this finding. One notes that prediction is especially good
in the English-speaking countries. This could reflect the fact that all
the tests and questionnaires were initially developed in the English lan-
guage. The tests were slightly more reliable in English-speaking coun-
tries, and it is possible that the questionnaire items were somehow clear-
er, leading to more precise responses. But why does Hungary fall so
near the top? Why is Flemish-speaking Belgium so near the bottom?

So far we have considered background factors as predictors of the
achievements of individual children. What about the prediction of be-
tween-country differences? Do national differences in the availability
of books in the home, for example, correspond to national differences

in achievement? Some evidence on this problem is provided in Table 3, where correlations are shown between average reading comprehension score and average score on each of a number of background variables. Correlations are shown with the three developing countries included, and also with these countries removed.

From Table 3 it is apparent that any of a number of background variables corresponds fairly well with average achievement if the three developing countries are included. However, when these three countries are omitted, the correlations are generally quite small, and quite a different set of variables are the best predictors. It is also true that the variables that best differentiate among countries are not the same as those that best differentiate among individuals. For example, among the developed countries number of magazines differentiates better than number of books, whereas for individual pupils the order is quite the reverse. Again, as between countries the report that parents help with homework is a favorable indicator, while as between pupils within a country it is an unfavorable one. As between countries, time devoted to TV and radio is as powerful an indicator as time spent reading for pleasure; for individuals reading time is very much more predictive. It appears that the dynamics of prediction across countries is rather different from the dynamics across individuals. One interpretation would be that indicators of economic development are more potent across countries, whereas indicators of cultural enrichment are more potent across individuals.

In the IEA studies some attention was also paid to school characteristics as indicators of achievement. In those analyses it was extremely important to partial out the influence of background variables of the

sorts considered in this paper. Background factors which gave corre-
lations of around 0.30 as between individuals yielded correlations as
high as 0.70 when dealing with average input and average achievement
for a school. By comparison, most school variables (that is, variables
describing some aspect of schooling within a school) gave small corre-
lations and ones that were erratic and inconsistent from country to
country. Thus, in spite of the modest correlations that we obtained
for background variables, these seemed to be much more effective pre-
dictors than any of the items that described the school as an educa-
tional unit. If direct measures had been available of the children as
they entered school, even higher correlations would almost certainly
have been obtained between pupil input and average achievement. In
many countries, of which the United States is one, the input variables
delimit rather sharply the range of outputs that it is reasonable to ex-
pect for a school. Thus, though the home background factors provide
only a rough guide to expected individual performance, they define
rather sharply the expected performance of a school.

Table 1

Median Correlation, Across Countries, of Background Factors and Individual Achievement (Decimal points omitted)

	Reading Comprehension			Science			Literature	
	10	**14**	**18**	**10**	**14**	**18**	**14**	**18**
Father's occupation	28	29	11	23	23	09	--	--
Father's education	--*	20	17	--	17	10	17	12
Mother's education	--	19	13	--	15	08	15	12
Books in home	25	27	13	23	21	09	23	13
Magazines in home	--	14	03	--	06	07	14	08
Use of Dictionary	11	10	06	09	09	-02	10	09
Family size	-14	-14	-02	-12	-10	-02	-12	-04
Sex of student	02	02	05	-11	-20	-30	21	18
Parents help homework	-03	-08	-06	-06	-11	-07	-06	-05
Parents correct spelling	06	02	-03	04	-01	-05	00	01
Parents correct writing	01	01	-02	00	00	-01	04	03
Encourage to read	06	07	04	06	05	-06	07	07
Interested in school	08	10	-01	07	05	-06	07	06
Encourage visit museums	--	05	05	--	03	-04	07	06

*Data not available for this age group or subject

Table 2

Composite Prediction in Each Country and Population
(Decimal points in correlations omitted)

	Reading Comp. vs. Background Composite			Science vs. Home Circumstances			Literature vs. Home Background	
	11	14	18	10	14	18	14	18
Australia	--*	--	--	--	33	11	--	--
Belgium (Fl.)	27	32	34	16	15	--	15	17
Belgium (Fr.)	40	33	22	30	--	--	26	07
Chile	14	42	32	13	26	29	30	21
England	44	53	15	41	45	-02	36	07
Fed. Rep. Ger.	--	--	--	20	31	01	--	--
Finland	38	48	13	23	34	10	30	06
France	--	--	--	--	--	06	--	--
Hungary	45	47	29	25	31	22	--	--
India	15	18	16	07	15	18	--	--
Iran	38	23	22	19	17	09	20	20
Israel	54	54	30	--	--	--	--	--
Italy	31	33	27	18	16	17	21	20
Japan	--	--	--	33	38	--	--	--
Netherlands	35	37	15	30	27	08	--	--
New Zealand	--	41	20	--	33	07	25	08
Scotland	46	51	23	42	48	14	--	--
Sweden	30	41	27	27	28	13	21	11
Thailand	--	--	--	--	31	--	--	--
U.S.A.	42	51	46	40	41	31	32	27

*Data not available in this country for this subject

Table 3

Correlations of Country Mean Reading Comprehension with Other National
Variables. Population II

Variable	All 15 Countries	12 Developed Countries
Father's education	.60	.14
Mother's education	.73	.23
Expected education	.67	.30
Hours homework weekly	.25	.19
Hours instruction--mother tongue	.21	.47
Parents help with homework	.53	.13
Parents encourage to read	.56	.04
Parents interested in school	.07	.12
Dictionary available	.09	.25
Number of books in home	.85	.17
Number of magazines	.71	.36
Hours radio or TV	.92	.28
Frequency movie attendance	.23	.07
Hours reading for pleasure	.16	.29